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Legal And Economic Methods As An Environmental Risk Management Mechanism.

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ABSTRACT

The article defines environmental risk and its directions concepts, illustrates the procedure pursuant to which the Russian Federation regulates at the state legislation level environmental risks, contributes to the environmental problems solution, participating in Conventions and environmental agreements. The methods of smoothing and avoiding environmental disturbances as well as manners of consequences elimination are provided. The methods of environmental accidents prevention are proposed.
Keywords: environmental risk, legal regulation, conventions, smoothing theory, environmental psychology.

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INTRODUCTION

To be successful in modern conditions means to be able to identify, analyze and correctly assess risks. Risk management can be described as a set of methods, techniques, and measures that allow, to a certain extent, predict the occurrence of dangerous events and take measures to eliminate or reduce the negative consequences of such events.

Environmental risk is caused by inconsistency or inadequate understanding of the importance of the interaction of lawmaking and the environment. Here, economic losses can be caused by a situation of uncertainty in the technogenic sphere and climatic manifestations, natural disasters. The ambiguity of understanding of events occurring in the external environment, as a result, leads to inadequate management decisions that lead to absolutely no result that was supposed to be.

The purpose of the study: the definition of legal and economic areas in making management decisions in minimizing the consequences of risk and predicting the possibility of their occurrence, both at the state and at the organizational level.

MATERIALS AND METHODS

The study was based on a hermeneutic analysis of regulatory documents. An expert approach was used to assess and prevent environmental risks. During the study, various methods of knowledge, interpretation, systematization, and synthesis of information were used.

RESULTS AND DISCUSSION

The concept of “environmental risk” is interpreted in various legal documents, but its legal definition is established by art. 1 of the Federal Law "On Environmental Protection" [1] No. 7-ФЗ dated January 10, 2002 - "this is the probability of an event having an adverse effect on the environment and caused by the negative impact of economic and other activities, natural and man-made emergencies" [4].

For some entrepreneurs, environmental risk is an objective category, and for others, it is subjective. V.A. Eugensicht protects the subjective concept of risk since risk is associated with the will and consciousness of man [5]. In the conditions of alternatives, the entrepreneur chooses the variant of his behavior taking into account the danger, the threat of possible fines for environmental violations, the threat of losing the enterprise.

Environmental risk, as a complex problem, is inextricably linked with the psychological understanding of the danger of environmental disasters.

Ecological psychology is a field of psychology that studies the relationship between a person and the environment (spatial-geographical, social, cultural), organically incorporated into human life and serves as an important factor in the regulation of his behavior and social interaction.

The main reason for the emergence of environmental psychology was a sharp exacerbation of social problems that arose in society, where, on the one hand, the development of civilization, social progress stimulated a qualitatively new leap in the knowledge of nature, society, man himself, and on the other, all the harmful consequences that bear civilization.

Environmental risks have a wide range of interactions with the state and society, from this point of view, they can be classified as shown in Figure 1.

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Figure 1: Classification of environmental risks

Consider what caused the risks shown in Figure 1:

Socio-environmental risks - due to the protective reaction of the state and society to the exacerbation of the environmental situation;

Environmental and regulatory risks - due to the adoption of environmental laws and regulations that have a tendency to tighten;

Ecological and political risks - due to environmental protests;

Environmental and economic risks - due to the activities of business entities.

Environmental risk management begins with an analysis of the risk situation and the development of a solution aimed at minimizing risk loss.

All elements of the production and economic potential of organizations and the state have varying degrees of sensitivity to environmental risks, the most susceptible human resource of the organization. To protect it, the Federal Law "On Environmental Protection" has been adopted and is functioning.

The state develops and legislates measures that will help prevent a dangerous risk situation.

According to the working papers, since 1995, Russia has been a party to approximately 78 multilateral agreements and major protocols to them in the field of environmental protection and the preservation of natural resources [3]. Relevant of them:

- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. 1989, Basel, Switzerland. Russia joined in 1990;
- Bucharest Convention (for the protection of the Black Sea from pollution). 1992, Bucharest, Romania;
- Vienna Convention on Civil Liability for Nuclear Damage. 1963, Vienna, Austria (entered into force in 1977);
- Vienna Convention for the Protection of the Ozone Layer. 1985, Vienna, Austria (Russia since 1988);
- Ramsar Convention on Wetlands of International Importance, mainly as habitats for waterfowl. 1971, Ramsar, Iran. (Russia since 1977);
- Geneva Convention on the prohibition of military or any other hostile use of environmental influences. 1977, Geneva, Switzerland;
- Helsinki Convention on the Transboundary Effects of Industrial Accidents. 1992, Helsinki, Finland;
- Geneva Convention on Long-range Transboundary Air Pollution. 1979, Geneva, Switzerland;

- Convention on Environmental Impact Assessment in a Transboundary Context. 1991, Espoo, Finland;
- Intergovernmental agreement of the States members of the Commonwealth of Independent States on cooperation in the field of ecology and environmental protection. 1992, Moscow, Russia;
- UN Framework Convention on Climate Change. 1992, New York, USA;
- The Kyoto Protocol to the United Nations Framework Convention on Climate Change (1992) was adopted in December 1997 on the stabilization of greenhouse gas emissions;
- Paris Environmental Agreements under the UN Framework Convention of December 12, 2015. Terrorism. Global warming.

Another environmentally sensitive element is land and forest land. To protect forests, special conditions of use are legally stipulated, which is possible only for the purpose of preserving the environment-forming, water-protective, protective and other useful functions of forests. In these territories, according to the Forest Code of the Russian Federation, it is prohibited to carry out activities that are incompatible with their intended purpose and useful functions, in particular, clear-cutting is prohibited in all selected categories. Invaluable forests, in addition, the placement of capital construction objects is prohibited, with the exception of hydraulic structures [2].

Another such measure is environmental insurance. In addition to environmental insurance, such measures as licensing certain types of activities that pose a threat to the environment, environmental certification, mandatory state environmental assessment of hazardous activities, state environmental supervision, standardization system (discharges, emissions, waste generation), the presence of sanctions for a negative impact on the environment, including payment for wasps, discharges, disposal of waste consumption and production.

According to the EMERCOM of Russia, natural emergency situations occur quite often. The total number of natural emergencies that occurred in the territory of the Russian Federation is presented in Table 1.

Table 1: The total number of natural emergencies that occurred in the territory of the Russian Federation

Types of natural emergencies	2010	2011	2012	2013	2014	2015	2016	2017
Total amount	118	65	148	114	44	45	54	42
earth quakes, volcanic eruptions	8	4	2	4	-	-	-	-
dangerous geological phenomena (landslides, mudflows, landslides, debris)	-	-	1	1	1	-	2	2
storms, hurricanes, tornadoes, squalls, heavy snowstorms	3	2	9	6	10	4	6	3
avalanches	1	-	-	1	-	-	-	1
heavy rain, heavy snow, heavy hail	6	2	12	18	16	11	21	14
frost, drought	20	2	18	49	3	16	7	4
marine hazardous hydrological phenomena (strong waves, ice pressure, ship icing)	-	-	-	1	-	-	-	-
coas talice separation	14	13	8	4	2	-	1	-
dangerous hydrological phenomena	8	17	21	19	7	7	15	13
large wild fires	58	25	77	11	5	7	2	5

The data indicate a trend to reduce environmental hazards, which indicates a positive trend in the prevention and control of environmental risks. Particularly noticeable is the struggle to reduce environmental risks from forest fires, the number of which has decreased 10 times in the last seven years.

The positive trend is confirmed by the costs of environmental activities, the dynamics of which are steadily increasing. So, according to statistical reporting, the costs from 2005 to 2017 increased from 235 million rubles. up to 657 ml. rub. accordingly, which is clearly shown in Figure 2.

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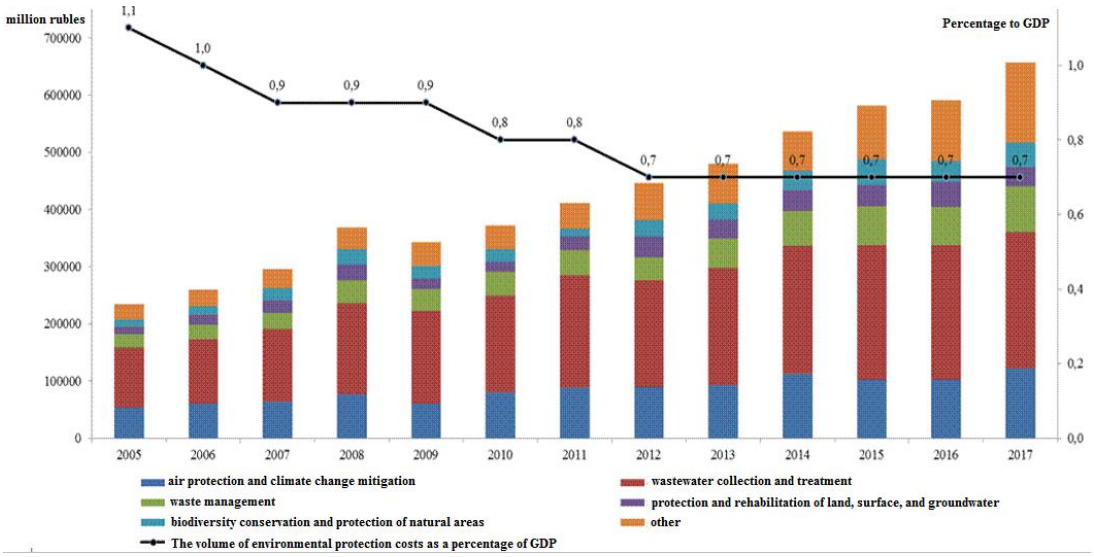

Figure 2: The cost of environmental protection (according to the Federal State Statistics Service)

Environmental risk management is impossible without an assessment of their magnitude, and decision making directly depends on the completeness and accuracy of the calculations made. Consider options for assessing the consequences and prevention of environmental risks [3].

Gas and petrol stations in cities represent the most pressing environmental risk. The time of approach of a cloud with highly toxic substances to a certain point depends on the speed of cloud transfer by the air flow and is determined by the formula (1):

$$T = \frac{S}{V}, \qquad (1)$$

S – distance from the source of infection to a given object, km;
V – transfer speed of the front of the cloud of contaminated air, km / h.

Method of decision: according to hydrometeorological services we determine the wind speed, then in isothermal conditions, according to the reference book we find the speed of transfer of the front of the cloud of contaminated air.

In case of leakage of toxic substances. The duration of the damaging effect is determined by the time of evaporation from the area of the spill using the formula (2):

$$T = \frac{H \times D}{K_2 \times K_4 \times K_7}, \qquad (2)$$

H – spill layer thickness, m;
D – density[1]toxic substance, t/m^3;
K_2 – the coefficient of physical and chemical properties of a toxic substance (for ammonia - 0.025; for nitrile of acrylic acid - 0.043; for chlorine - 0.052);
K_4 – wind speed ratio (at a wind speed of 4 m / s is 2);
K_7 – the coefficient of influence of air temperature (for ammonia at 0ºC is equal to 0.6; for nitrile of acrylic acid - 0.8; for chlorine - 0.6).

When proactively forecasting the scale of contamination by chemical elements in case of industrial accidents, it is recommended to take as input data: Q_0 – the number of toxic substances in the maximum volume of a single container (technological, storage, transport, etc.), meteorological conditions - inversion[2], wind speed 1 m / s. The magnitude of the emission is determined by the formula (3):

[1]Ammonia density - 0.681; acrylic acid nitrile, 0.806; chlorine - 1,553.
[2]The increase in temperature in the atmosphere from the bottom up instead of the usual decrease.

$$Q = D \times V_x, \quad (3)$$

D – density of toxic substances, t/m^3;
V_x – storage capacity, m^3.

Further, it is advisable to determine the equivalent[3]the amount of substance in the primary[4]a cloud of toxic substance according to the formula (4):

$$Q_{E1} = K_1 \times K_3 \times K_5 \times K_7 \times Q_0, \quad (4)$$

K_1 – coefficient depending on the storage conditions of toxic substances. For compressed gasesK_1=1;
K_3 – threshold ratio[5]chlorine toxic doses to threshold toxic doses of another toxic substance.

Threshold chlorine toxicity - 0.6 mg min/l. Threshold toxicity of ammonia stored under pressure - 15 mg min/l.

K_5 – coefficient taking into account the degree of vertical stability of the atmosphere; for inversion it is assumed to be 1, for isotherm - 0.23 for convection – 0,08;
K_7 – coefficient of influence of air temperature. For compressed gases K_7=1;
Q_0 – the amount of substance emitted (spilled) in an accident t.

Then the equivalent amount of substance in the second is determined[6]a cloud of poisonous matter according to the formula (5):

$$Q_{E2} = \frac{(1-K_1)\times K_2 \times K_3 \times K_4 \times K_5 \times K_6 \times K_7 \times Q_0}{H \times D}, \quad (5)$$

K_6 – coefficient depending on the time N, passed after the beginning of the accident. Its value is determined after calculating the duration T (h) evaporation of the substance.
If N<T, that $K_6=N^{0,8}$;
If N>=T, that $K_6=T^{0,8}$.

By T<1 hour should take K_6 per 1 hour.

The maximum possible value of the depth of transfer of air masses is determined by the formula (6):

$$G=N \times V, \quad (6)$$

N – time from the beginning of the accident, h;
V – transfer speed of the front of contaminated air at a given wind speed and degree of vertical stability of air, km/h.

CONCLUSION

Scientific and technical progress has reached such heights that it is important to take up the quality of life in order to have time to maintain environmental safety. Only a high level of environmental friendliness and quality of Russian entrepreneurship can become a condition for Russia's entry to the world level as an environmental leader.

[3]Equivalent.
[4]A cloud of poisonous substances, resulting from the instantaneous (1-3 min) passage into the atmosphere of a part of poisonous substances from the tank during its destruction.
[5]Inhalation toxoid that causes the initial symptoms of a lesion.
[6] cloud of poisonous substances resulting from the evaporation of spilled material from the underlying surface.

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